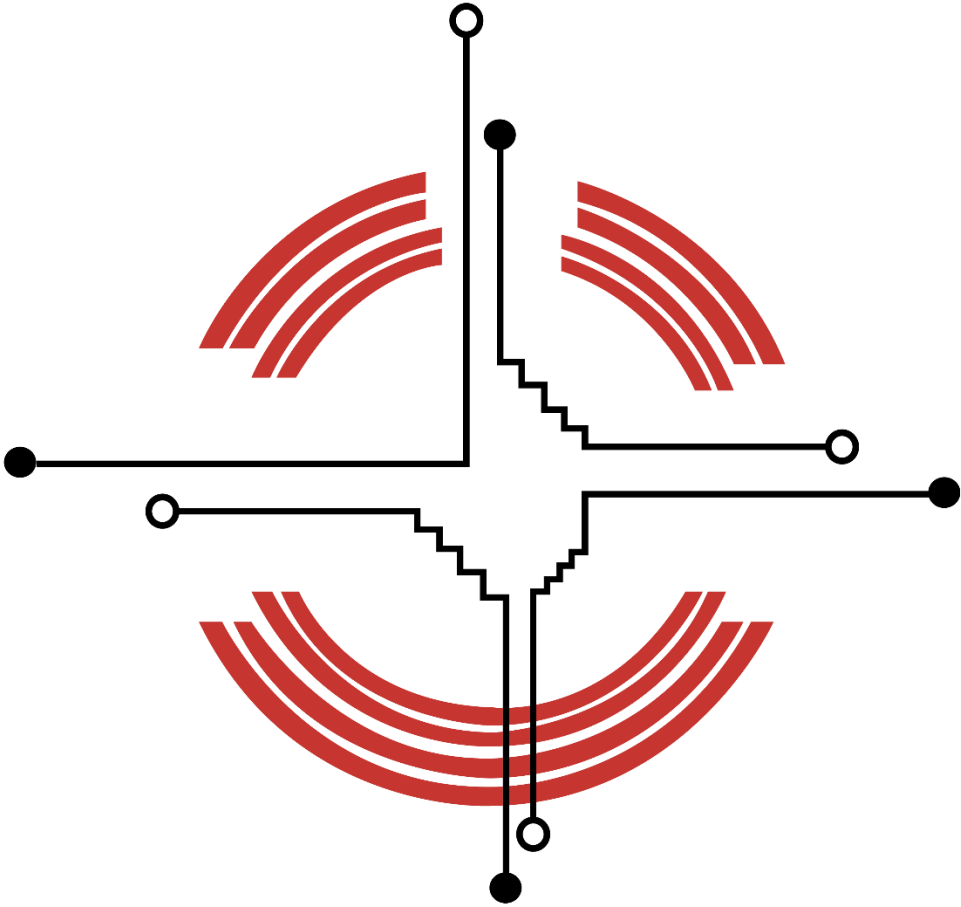


NAVAJO TECHNICAL UNIVERSITY



2021-2022 CATALOG

ADDENDUM

BACHELOR OF SCIENCE

Environmental Engineering

A Bachelor's degree in Environmental Engineering requires 122 credit hours and the Environmental Engineering degree is designed for a four-year program of study. The minimum credit load for a full-time student is 12 credit hours per semester.

A student needs to complete general courses and general education electives within the first two years of study with a grade point average of 2.0 or better before taking the upper level core courses (300 and 400-level courses). However, to complete the program within four years, a credit load of 15 to 18 per semester is recommended. Also, this time can be reduced by attending summer sessions and/or interim sessions

Environmental Engineering Requirements: 122 Credits

ENVIRONMENTAL ENGINEERING PROGRAM		
Semester FIRST		CREDITS
ENGR-123	Computer Skills for Engineering	3
CS-101	Programming I	3
ENGL-1110	Composition I	3
MATH-1510	Calculus I	4
SSC-100	College Success Skills	1
Semester TWO		
ENGR-103	Introduction to Engineering	3
ENGR-130	Engineering Graphics	3
GIT-XXX	Elective	3
PHYS-1310C	Calculus Based Physics I	4
SOCI-2310	Contemporary Social Problems	3
Semester THREE		
MATH-1520	Calculus II	4
CHEM-1217C	Principles of Chemistry I	4
ENVE-2110	Fundamentals of Environmental Engineering	3
ENGR-236	Inferential Engineering Statistics	3
Semester FOUR		
NAV XXX	Dine Studies	3-4
CHEM-1225C	General Chemistry II for STEM Majors	4
GEOL-1120C	Environmental Geology	4
ENVE-286	Applications of Biology to Engineering	3
MATH-310	Differential Equations	4
Semester FIVE		
ENVE-355	Soil Mechanics	3
CHEM-2130C	Organic Chemistry	4
MATH-410	Linear Algebra	3
ENVE-390	Hydrology	3
COMM-1130	Public Speaking	3
Semester SIX		
HUMN-1180	History of American Indians in Media	3
CFA XXX	Creative Fine Arts	3
IE-380	Project Management	3
ENVE-338	Introduction to Environmental Water Chemistry	3
ENVE-325	Environmental & Water Engineering	3
Semester SEVEN		
ENVE-403	Water & Wastewater Treatment System Design	3
ENVE-429	Capstone I	3
ENVE-442	Environmental Engineering Lab	3
ENVE-455	Fate & Transport Process in Env. Engineering	3
Semester EIGHT		
ENVE-430	Capstone II	3
ENVE-468	Air Pollution Control	3
ENVE-XXX	Elective	3
ENV-425	Advance Environmental Law	3
ENVE-481	Hazardous Waste Management & Risk Assessment	3
Summer Semester		
ENVE-312	Summer Internship	3
TOTAL CREDIT HOURS REQUIRED		122

BACHELOR OF APPLIED SCIENCE

INFORMATION TECHNOLOGY

This program is structured to prepare students for immediate and continuing employment in two different areas: Careers in programming and computer or network operations and digital movie-making, digital sound, and graphics.

The Bachelor of Applied Science in Information Technology has a unique blend of computer programming and information technology skills. This program focuses on introducing and mastering parallel programming methodologies. It also blends a solid set of information technology skills with programming that includes computer security, web design, database design, and data center and cluster design and maintenance. Graduates of the program will be able to design, build, maintain, and program for distributed high performance computing and cloud computing environments that meet the global needs of business and scientific communities.

Any student seeking a **Bachelor of Applied Science degree** must complete a minimum of 36 credit hours of general education and 36 credit hours of core courses, and 48 hours of technology-based courses including practicum work. Students in the baccalaureate degree programs are required to complete a minimum of 30 credit hours in the upper division courses, i.e., 300 and 400 level courses before they can graduate. The required courses are listed below.

B.A.S. - Information Technology Requirements: 121-122 credits

Semester ONE		Credits
MATH-1510	Calculus I	4
IT-105	Introduction to Programming	3
IT-160	Introduction to Digital Ethics	3
ENGL-1210	Technical Communication	3
SSC 100	College Success	1
Semester TWO		
ENGL-2210	Professional and Technical Communication	3
BCIS-1115 or IT-XXX	Introduction to Computers or Lower Division Elective	3
IT-218	Algorithms & Data Structures	3
IT 142	Web Design Concepts	3
MATH-1520	Calculus II	4
Semester THREE		
HUMN 1180	History of Native American in Media	3
IT-150	System Administration	3
IT-262	Internetworking	3
IT-XXX	Lower Division IT Elective	3
PHYS-1230C or PHYS-1310C or BIOL-2110C or CHEM-1217C	Algebra-Based Physics I or Calculus-Based Physics I or Principles of Biology: Cellular and Molecular Biology or Principles of Chemistry I	4
Semester FOUR		
Diné Studies	NAVA1110, NAVA2210, NAVA2230	3-4
SSCXXX	Social Science Course	3
IT-222	Computer Security	3
IT-290	IT Big Data Project Management	3
PHYS-1240C or PHYS-1320C or BIOL-2120C or BIOL 226 or CHEM-1225C	Algebra-Based Physics II or Calculus-Based Physics II or Cellular and Molecular Biology or Principles of Biology or General Chemistry II for STEM Majors	4
Semester FIVE		
ENGL 2310 or NAVA 1310	Introduction to Creative Writing OR Rug Weaving I	3
MTH-410	Linear Algebra	3
IT-XXX	Lower Division IT Elective	3
IT 332	Network Security	4
IT-315	Multicore Programming	3
Semester SIX		
HUM XXX	Humanities/Social Science Course	3
IT-XXX	IT Upper Division Elective	4
MATH-1350	Introduction to Statistics	3
IT 375	Javascript Core Skills	4
IT 435	HPC Parallel Computing	3
Semester SEVEN		
MTH-205	Discrete Mathematics	3
IT-XXX	IT Upper Division Elective	3
IT 472	Web App Development	3
IT-405	Cluster Maintenance/Management	4
Semester EIGHT		
IT-440	Advanced Technology Security	3

IT-486	Information Management & Administration	3
IT-XXX	IT Upper Division Elective	3
IT XXX	IT Elective/ Any Engineering, Math, Computer Science or Information Technology course not repeating material	3
IT-499	Practicum	3
TOTAL CREDIT HOURS REQUIRED		121-122

Elective:

Lower Division Electives

- IT-110 Introduction to Digital Logic/Hardware Programming
- IT-111 Human Computer Interaction
- IT-112 Photography
- IT-115 Drawing and Visual Culture
- IT-118 Introduction to C++
- IT-120 Operating Systems
- IT-121 Database Systems and Data Preparation
- IT-125 Introduction to Digital Video
- IT-200 Sound Design
- IT-212 Documentary
- IT-215 Motion Graphics
- IT-220 Database Design
- IT-225 Digital Video II
- IT-275 Media Criticism
- IT-195/295 Topics in Information Technology

Upper Division Electives

- IT-312 Studio Recording
- IT-333 Introduction to Machine Learning
- IT-335 Data Visualization
- IT-345 Editing Concepts
- IT-350 Programming Interactivity
- IT-415 Audio Project
- IT-425 Applied Data Science
- IT-445 3D Modeling/Animation
- IT-480 Aural and Optical Perception
- IT-395/495 Topics in Information Technology

Certificate

LAW ENFORCEMENT “Offered in Chinle, AZ”

The technical certificate of Law Enforcement is a joint effort between NTU and the Navajo Nation Public Safety Department to produce Navajo Nation Police Officers. The 22-week certificate program provides both the academic and skills components that are required for Navajo Nation Law enforcement. The candidate must: 1. Satisfy the certificate requirements in the program prior to the date of graduation at which the certificate is to be awarded. 2 Have a minimum of 12 semester credits in residence that apply toward the certificate being pursued and meet the requirements for the applicable program.

The certificate in Law Enforcement on an academic track, that prepares students to fill both certified and non-certified law enforcement and criminal justice related positions. Students should be aware the different states have different requirements for police officer certification. The academic track does not provide certification for police officers in any state. The academic certificate, unlike the Navajo Nation Police Academy Law Enforcement Technical Certificate, includes twelve hours of general education.

Technical Certificate – Police Academy ONLY– Law Enforcement Requirements: 30 Credits

Semester ONE		Credits
PS 101	Introduction to Criminal Justice	3
PS 103	Public Safety Report Writing	3
PS 109	Substantive Criminal Law	3
PS 123	Law Enforcement Ethics: Ethics & Criminal Justice	3
PS 170	Forensic Science (Patrol Procedures)	3
PS 230	The Police Function I (Traffic)	3
PS 235	The Police Function II (Police Proficiency Skills)	3
PS 260	Procedural Criminal Law (Criminal Investigations)	3
NAVA 2230	Navajo Government	3
BCIS 1115	Introduction to Computers	3
TOTAL REQUIRED CREDIT HOURS		30

Certificate – Law Enforcement Requirements: 30 Credits

Semester ONE		Credits
ENGL 1110 or 1210	Composition I or Technical Communication	3
BCIS 1115	Introduction to Computers	3
PS 101	Introduction to Criminal Justice	3
MTH 113	Technical Mathematics or higher	3-4
PED 120	Strength Training	1
SSC 100	College Success	1
Semester TWO		Credits
NAVA 2230 or POS 220	Navajo Government or US & Arizona Constitution	3
PS 109	Substantive Criminal Law	3
PS 123	Law Enforcement Ethics	3
PS 260	Procedural Criminal Law	3
PS 2250	History of American Policing	3
PED 130	Jogging	1
TOTAL REQUIRED CREDIT HOURS		30

ONLINE PROGRAM

Bachelor of Arts

BUSINESS ADMINISTRATION

A degree in Business should open the door to many career options. The desire of the Department of Business is to provide an education in business of the highest possible quality. In the first two years of studying Business at NTU, students are required to take common set of courses to prepare them for more specialized courses in the third and fourth years. Many of these initial courses are shared with other departments at the university, allowing students to appreciate the interdisciplinary nature of business.

Students are encouraged to develop a broad knowledge of business. Knowledge in these specialized subjects is intended to lay the groundwork for entry into a range of much needed professions in the Native American Communities such as the Navajo Nation, entrepreneurship, hospitals, Navajo Housing Authority, Navajo Tribal Utility Association, etc.

A student needs to complete the core Business and general education courses within the first two years of study with a grade point average of 2.50 or better before taking the upper level core courses (300 and 400-level courses).

B.A. – Business Administration Requirements: 124 credits

Semester ONE		Credits
BIOL 1110C	General Biology	4
PSYC 1110	Introduction to Psychology	3
ACG 101	Accounting Principles I	3
BCIS 1115	Introduction to Computers	3
ENGL 1110	Composition I	3
SSC 100	College Success	1
Semester TWO		
CHEM 1120C	Introduction to Chemistry	4
NAVA 2210	Navajo Culture	3
COMM 2120	Interpersonal Communication	3
ACG 111	Accounting Principles II	3
MATH 1220	College Algebra	4
Semester THREE		
ENGL 2310	Introduction to Creative Writing	3
ECON 2120	Microeconomics Principles	3
ENGL 1120	Composition II	3
MATH 1350	Introduction to Statistics	3
LAW 203	Business Law	3
Semester FOUR		
ACG 212	Introduction to Finance	3
ACG 210	Principles of Management	3
LAW 205	Professional Responsibility and Ethics	3
ACG 225	Managerial Accounting	3
ECON 2110	Macroeconomics Principles	3
Semester FIVE		
ACG 216	Principles of Marketing	3
BUS 302	Human Resources Management	3
BUS 305	Effective Business Communication	3
BUS 310	Business Statistics	3
BUS 328	International Management	3
Semester SIX		
BUS 331	Social Environment of Business	3
BUS 335	Tourism and Hospitality Management	3
BUS 350	Organizational Theory and Behavior	3
BUS 340	Management Information System	3
BUS 352	Project Management	3
Semester SEVEN		
BUS 353	Supply Chain and Operation Management	3
BUS 364	Business of Gaming	3
BUS 375	Financial Management	3
BUS 440	Business Analytics	3
BUS 496	Senior Seminar and Strategic Management	3
Summer Semester		
BUS 437	Internship in Business	3
Semester EIGHT		
BUS 485	Global Business Strategies	3
BUS 480	Business Plan Development	3
BUS 380	Management for Environmental Sustainability and Durable Competitive Advantage	3
BUS 455	Entrepreneurial Practicum	3
TOTAL CREDIT HOURS REQUIRED		124

ONLINE PROGRAM

Associate of Applied Science

ACCOUNTING

The Accounting program is offering an Associate of Applied Science Degree while incorporating the Dine' Philosophy of Education and applying the concept of "learn by doing" by completing hands-on applications. It enables students to be job-ready for career opportunities abound as: Bookkeeper, Accounting Technician, Accounts Payable/Receivable Clerk, Payroll Clerk, or an Income Tax Preparer. Upon completion students have the option to continue and earn a Bachelors of Arts Degree in Business Administration.

A.A.S. - Accounting Requirements: 63-64 credits

GENERAL EDUCATION REQUIREMENTS		Credits
English/Communication: ENGL 1110 or ENGL 1210		3
Mathematics: MATH 1220 or higher		4
Natural or Physical Science course 1.		4
Dine Studies: NAVA 1110, NAVA 2210 or NAVA 2230		3-4
BCIS 1115	Introduction to Computers	3
SSC 100	College Success	1
ECON 1110	Survey of Economics	3
ACCOUNTING CORE REQUIREMENTS		
Semester ONE		Credits
ACG 101	Accounting Principles I	3
ACG 201	Payroll Accounting	3
ACG 210	Principles of Management	3
Semester TWO		
ACG 211	Accounting Software Applications	3
ACG 212	Introduction to Finance	3
LAW 203	Business Law	3
Semester THREE		
ACG 204	Advanced Accounting I	3
ACG 213	Introduction to Fund Accounting	3
ACG 215	Federal Taxation	3
ACG 216	Principles of Marketing	3
Semester FOUR		
ACG 214	Advanced Accounting II	3
ACG 211	Accounting Software Applications	3
ACG 220	Cost Accounting	3
ACG 225	Managerial Accounting	3
TOTAL REQUIRED CREDIT HOURS		63-64

ONLINE PROGRAM

Associate of Applied Science

PUBLIC ADMINISTRATION

The A.A.S. degree in Public Administration is awarded upon completion of a course in a cross-disciplinary program. Students will develop the skills and the intellectual discipline necessary to enter any Navajo Nation governmental office and provide worthwhile and creative administrative and managerial services. The course requirements for this program are comprised of courses offered among several existing certificate and degree programs.

A.A.S. - Public Administration Requirements: 63-64 Credits

GENERAL EDUCATION REQUIREMENTS		Credits
English/Communication: ENGL 1110		3
Mathematics: MATH 1220 or higher		4
Dine Studies: NAVA 1110, NAVA 2210 OR NAVA 2230		3-4
Natural or Physical Science: 1.		4
Information Tech/Applied Computers: BCIS 1115 or higher		3
SSC100	College Success	1
PUBLIC ADMINISTRATION CORE REQUIREMENTS		
Semester ONE		Credits
ACG 101	Accounting Principles I	3
ADM 101	Keyboarding and Formatting I	3
PAD 101	Introduction to Public Administration	3
Semester TWO		
PAD 110	Public Finance Administration	3
ACG 212	Introduction to Finance	3
ADM 115	Records Management	3
BUSA 2420	Tribal Law	3
Semester THREE		
PAD 210	Public Sector Management	3
ACG 210	Principles of Management	3
LAW 203	Business Law	3
PAD 225	Human Behavior in Organization	3
Semester FOUR		
LAW 205	Professional Responsibility and Ethics	3
ACG 216	Principles of Marketing	3
PAD 230	Internship/Practicum	3
PAD 295	Topics in Public Administration	3
TOTAL REQUIRED CREDIT HOURS		63-64

*** Some of the Business and General Education courses have a prerequisite. Please check the course descriptions for the appropriate prerequisite course(s)*

ONLINE PROGRAM

Associate of Arts

GENERAL STUDIES

The purpose of the Associate of Arts degree in General Studies is to provide a flexible degree program that allows students to complete their degree by attending classes that focus primarily on general education courses yet provides insight into a variety of potential academic pathways for those who are undecided about a major. The General Studies program offers practical introductions to the field of general education classes at the college level; additionally, students may transfer many, if not all, credits to a four-year college or University if they choose to pursue a bachelorette degree.

A.A. - General Studies Requirements: 62 Credits

Semester ONE		Credits
MATH 1220	College Algebra	4
ENGL 1110 or ENGL1210	Composition I or Technical Communications	3
NAVA 2230	Navajo Government	3
NAVA 2240	Dine Philosophy of Education	3
BCIS 1115	Introduction to Computer	3
SSC 100	College Success	1
Semester TWO		
NAVA 2210	Navajo Culture	3
ENG 1410	Introduction Literature	3
NAVA 2220 NAV 212	Navajo History OR Navajo Historical Perspective of Navajo	3
CHEM 1120C	Introduction to Chemistry	4
HIST 1110	United States History I	3
Semester THREE		
COMM 2120	Interpersonal Communication	3
ENGL 1120 ENGL 2120	Composition II OR Intermediate Composition	3
PSYC 1110	Introduction to Psychology	3
NAV 210	Contemporary Navajo Life & Experiences	3
ECON 1110	Survey of Economics	3
Semester FOUR		
ENGL 2310	Introduction to Creative Writing	3
FDMA 2175	International Cinema	3
COMM 1130	Public Speaking	3
BIOL 1110C	General Biology	4
PED 101	Physical Education	1
TOTAL REQUIRED CREDIT HOURS		62

ONLINE PROGRAM

Associate of Science

MATHEMATICS

Mathematics is a program that focuses on the analysis of quantities, magnitudes, forms, and their relationships, using symbolic logic and language. It includes instruction in algebra, calculus, functional analysis, geometry, number theory, logic, topology and other mathematical specializations. Mathematics is a versatile program that can be applied to almost any career. A student with a degree in mathematics will have an endless opportunity. A student who studies mathematics will have the ability to think analytically, solve problems, and communicate precisely. Graduates of this program should be able to seek gainful employment as a teacher, mathematician, statistician, financial analyst, consultant, engineer, physician, lawyer, and research analyst

A.S. – Mathematics Requirements: 60-61 Credits

Semester ONE		Credits
MATH 1220	College Algebra	4
MATH 1240	Pre-Calculus	4
ENGL 1110	Composition I	3
BCIS 1115	Introduction to Computers	3
SSC 100	College Success	1
Summer Session		
MATH 1230	Trigonometry	4
Semester TWO		
MATH 1510	Calculus I	4
MATH 1350	Introduction to Statistics	3
PHYS 1230C	Algebra Based Physics I	4
NAVXXX	NAVA1110, NAVA 2210 or NAVA 2230	3-4
Semester THREE		
MATH 1520	Calculus II	4
MTH 306	College Geometry	3
SOCI 1110	Introductions to Sociology	3
PSYC1110	Introduction to Psychology	3
Semester FOUR		
MATH2410	Differential Equation	4
COMM1130	Public Speaking	3
MATH2530	Calculus III	4
MTH 410	Linear Algebra	3
TOTAL REQUIRED CREDIT HOURS		60-61

Course Descriptions:

Environmental Engineering

ENVE 286 (3) Applications of Biology to Environmental Engineering

Ubiquitous and rich sensor-filled environments are finding their way out of the laboratory and into our workplaces and homes. Networked societies where personal computing devices for mobile phones to smartcards filler pockets and electronic devices surround us at home and work. The Web has grown from a largely academic network into the Hubble business and everyday lives. As the distinctions between the physical and the digital and between work and leisure start to break down, human-computer interaction is also changing radically. This course introduces students to HCI interaction design, and usability or interactive systems design. Students will be introduced to the foundations, design process, and models and theories of HCI.

Prerequisite: MATH-1120 or PHYS-1310C

ENVE 312 (3) Summer Internship

The goals of Summer Internship program are for Environmental Engineering students to develop and demonstrate employer-valued skills such as application of engineering know-how to solve problems, teamwork, excellent oral and written communication skills, time and resource management, and attention to details.

ENVE 325 (3) Environmental & Water Engineering

Principles and methods of analysis of environmental engineering focusing on physical, chemical, and biological principles. Topics include greenhouse gas effects, tropospheric air pollution, environmental air pollution, environmental risk assessment, surface and group water pollution, drinking and wastewater treatment, and control of the soil-water-plant medium for optimum plant growth and environmental protection.

ENVE 338 (3) Introduction to Environmental Engineering Water Chemistry

Covers principles of chemistry applicable to the understanding, design, and control of water and wastewater treatment processes and to reactions

in receiving waters. Topics include chemical thermodynamics, reaction kinetics, acid-base equilibria, mineral precipitation/dissolution, and electrochemistry. Focuses on the mathematical description of chemical reactions relevant to engineered processes and natural systems, and the numerical or graphical solution of these problems. *Prerequisite: CHEM-2130C*

ENVE 355 (3) Soil Mechanics

Soil mechanics is the study of soil physical properties and processes as applied to management and prediction under natural and managed ecosystems. The course will deal with the dynamics of physical soil components and their phases such as solids, liquids, and gases. It will draw on the principles of science and engineering.

ENVE 390 (3) Hydrology

Watershed based hydrologic phenomena including hydrologic water-cycle analysis, precipitation, evapotranspiration, snow/snowmelt, streamflow, floods, routing and surface runoff events. Statistical and probabilistic methods in water supply and flood hydrology. Application of analytical techniques to solve water resource problems. *Prerequisite: PHYS-1310C or MATH-1510*

ENVE 403 (3) Water & Waste System Design

Design of unit operations in water, wastewater, waste management, and/or air quality engineering. Student-generated data informs and drives the design of relevant processes. Design of drinking water and wastewater treatment plants. Applies microbiology, water chemistry principles and includes treatment plant design techniques, disinfection, and reuse. *Prerequisite: CHEM-2130C*

ENVE 442 (3) Environmental Engineering Lab

Theory and application of environmental laboratory methods for measurement of fundamental properties and characteristics of dissolved and particulate constituents in water, air and soil systems using basic concepts including mass, energy, and number balances and risk. *Prerequisite: CHEM-2130C*

ENVE 455 (3) Fate & Transport Processes in Environmental Engineering

Introduction to movement and transformation of substances released in the natural environment. Fundamentals of advection, dispersion and reaction. Aggregation and parameterization of various mixing processes, leading to dispersion at larger spatial and temporal scales. Importance of heterogeneity, anisotropy and stratification in natural media. Basic principles are illustrated by application to atmospheric, river and estuarine pollution problems. *Prerequisite: GEOL-1120C or ME-353*

ENVE 468 (3) Air Pollution Control Engineering

This course deals with air pollution control and quality engineering. We will cover fundamentals of air pollutant formation in process technologies and identification of options for mitigating or preventing air pollutant emissions. Air quality engineering will deal with large-scale, multi-source control strategies, with focus on the engineering principles of atmospheric pollutant interactions. *Prerequisite: ENVE-455*

ENVE 472 (3) Hydrogeology

This course focuses on the theory and principles of groundwater and stream flow, and their interconnection with hydrologic cycle. Topics include hydrologic equation, evapotranspiration, well drilling and testing, porosity and permeability, Darcy's law, confined and unconfined aquifers, flow nets, geology of groundwater occurrence, water table maps, geophysical exploration methods, well logs, stream flow, hydrographs, and contaminant transport in porous media.

ENVE 475 (3) Microbiology for Engineers

Surveys microbiology topics germane to modern civil and environmental engineering. Provides fundamentals needed to understand microbial processes and ecology in engineered and natural systems and reviews applications emphasizing the interface between molecular biology and classical civil engineering.

ENVE 481 Hazardous Waste Management and Risk Assessment

The objective of this course is to enable students to think and apply multidisciplinary approaches to managing industrial and hazardous wastes. Topics include familiarization with sources, classification, storage, transportation, various physicochemical and biological remediation technologies, and pertinent federal and state regulations. Knowledge of physicochemical and/or biological characteristics of a waste will be used to design appropriate disposal options. Lectures are supplemented with real-world case studies such as the abandoned uranium mine wastes. *Prerequisite: CHEM-2130C or GEOL-1120C*

ENVE 2110 (3) Fundamentals of Environmental Engineering

This course focuses on cross-disciplinary approaches to understanding mechanisms of contaminant release, transport, and fate in the environmental systems (soil, water/wastewater, Atmosphere). Principles of mathematics, chemistry, physics, and biology will be used to characterize, quantify, analyze, and manage resources and pollution challenges in the environmental systems. *Prerequisite: ENGR-103*

INFORMATION TECHNOLOGY

IT-111 (3) Human Computer Interaction

Ubiquitous and rich sensor-filled environments are finding their way out of the laboratory and into our workplaces and homes. Networked societies where personal computing devices for mobile phones to smartcards filler pockets and electronic devices surround us at home and work. The Web has grown from a largely academic network into the Hubble business and everyday lives. As the distinctions between the physical and the digital and between work and leisure start to break down, human-computer interaction is also changing radically. This course introduces students to HCI interaction design, and usability or interactive systems design. Students will be introduced to the foundations, design process, and models and theories of HCI.

IT-121 (3) Database Systems and Data Preparation

Ubiquitous and rich sensor-filled environments are finding their way out of the laboratory and into our workplaces and homes. Networked societies where personal computing devices for mobile phones to smartcards filler pockets and electronic devices surround us at home and work. The Web has grown from a largely academic network into the Hubble business and everyday lives. As the distinctions between the physical and the digital and between work and leisure start to break down, human-computer interaction is also changing radically. This course introduces students to HCI interaction design, and usability or interactive systems design. Students will be introduced to the foundations, design process, and models and theories of HCI.

IT-290 (3) Big Data Project Management

This course will introduce students to the knowledge-based necessary to manage and deliver top-notch solutions for an organization. Students will go through the data science project life cycle, explore the common pitfalls encountered at each step, and learn how to avoid them. The effective use of DevOps and ModelOps will be covered to improve data science projects. *Prerequisite: IT-120*

IT-333(3) Introduction to Machine Learning

This course exposes students to the fundamental concepts of machine learning. Students will apply these concepts to build environments where machines/software can learn and adapt to complex situations and develop solutions. Some areas of application to be covered include: recommendation engines; face recognition; predicting with regression algorithms; neural networks; text analysis techniques; clustering and topic modeling; convolutional neural networks; and reinforcement learning. *Prerequisite: IT-218*

IT-486 (3) Information Management/Administration

This course will introduce students to the knowledge-based necessary to apply the tools and techniques in the building of information systems. Students will gain a business perspective on putting together systems to support all business areas. Students will build, hands-on, the

information systems that can include database management, data communications, website design and development, information system security, big data and analytics, electronic and mobile commerce, and informatics. *Prerequisite: IT-290*

IT-499 (3) Practicum

This course provides a forum where students can acquire entry level knowledge and skills in Information Technology while in a performance setting. Students apply the knowledge and skills acquired at NTU in an appropriate work environment approved by the instructor. *Prerequisites: Sophomore standing*

LAW ENFORCEMENT

PS 2250-History of American Policing

This course provides an overall exploration of the historical development and structure of the United States criminal justice system, with emphasis on how the varied components of the justice system intertwine to protect and preserve individual rights. The course covers critical analysis of criminal justice processes and the ethical, legal, and political factors affecting the exercise of discretion by criminal justice professionals.